

**REMARKS**

The Office Action mailed December 4, 2002, has been received and reviewed. Claims 1 through 29 are currently pending in the application. Claims 1 through 29 stand rejected. Claim 9 has been objected to. Applicants have canceled claim 15, amended claims 1, 2, 3, 9, 14, 16, 20 and 21, and respectfully request reconsideration of the instant application in light of these amendments and the remarks which follow.

**Preliminary Amendment**

Applicants' undersigned attorney notes the filing herein of a Preliminary Amendment on January 22, 2002, which filing was not acknowledged in the outstanding Office Action. Should the Preliminary Amendment have failed for some reason to have been entered in the Office file, Applicants' undersigned attorney will be happy to have a true copy thereof hand-delivered to the Examiner.

**35 U.S.C. § 103(a) Obviousness Rejections**

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Obviousness Rejection Based on U.S. Patent No. 4,099,167 to Pomerantz et al.

Claims 1 through 6 and 14 through 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Pomerantz et al. (U.S. Patent No. 4,099,167). Applicants respectfully traverse this rejection, as hereinafter set forth. Claim 15 has been canceled, rendering the rejection moot with respect thereto.

Applicants have amended claim 1 to specify:

A capacitive sensor for detecting a level of fluid in a container having an interior volume, the sensor comprising mutually cooperative first and second electrodes arranged for placement on the container in isolation from the interior volume of the container, wherein each electrode exhibits a two-dimensional area having a vertical dimension and a horizontal dimension, and wherein the first and second electrodes are arranged such that a majority of each of their respective areas are vertically and horizontally offset from each other. (Emphasis added)

Pomerantz, on the other hand, discloses a very different structure. The electrode pairs 10 and 50 referenced by the Examiner are disposed, respectively, on the interior and the exterior of wall 30 of container 20. As disclosed by the reference, the FIG. 1 structure relies upon at least two electrodes placed 40, 50 on the exterior of wall 30 and a cooperative electrode 10 disposed on the interior of wall 30 for each fluid level to be sensed. Moreover, the majority of the respective areas of each of electrodes 10 and 50 are not vertically and horizontally offset. It is clear from FIG. 1 of the reference that the majority of electrode 50 vertically and horizontally overlaps electrode 10. It is further noted that the embodiment of FIG. 2 of Pomerantz disclosed completely overlapping pairs of electrodes 140 and 150 and the embodiment of FIG. 3 of Pomerantz discloses completely overlapping pairs of electrodes 240 and 250 and a third vertically elongated electrode 210 which vertically overlaps a majority of each electrode 240 and 250. The embodiment of FIG. 4 of Pomerantz discloses at least two electrodes 340 and 350 (one electrode 5350 for each fluid level to be sensed), wherein each electrode 350 is completely vertically and horizontally overlapped by electrode 340. Accordingly, the rejection of claim 1 should be withdrawn.

Claims 2-6, 14, 16 and 17 are allowable as depending from claim 1.

Claim 2 is further allowable as Pomerantz fails to disclose first and second electrodes are arranged such that their respective areas are substantially vertically and horizontally offset from

each other. The electrodes 40 and 50 referenced by the Examiner are not mutually cooperative electrodes, as each in turn cooperates with electrode 10 but not with each other.

Claim 3 is further allowable as Pomerantz fails to disclose first and second electrodes are arranged such that their respective areas are completely vertically and horizontally offset from each other. Again, electrodes 40 and 50 are not mutually cooperative electrodes.

claim does not call for mutually cooperative

Claim 4 is further allowable as Pomerantz fails to disclose first and second electrodes vertically spaced from each other. Contrary to the position of the Examiner, electrode pairs 10, 50 are each mutually overlapping, and not vertically spaced.

Claim 14 is further allowable as Pomerantz fails to disclose (in FIG. 1) horizontally spaced mutually cooperative electrodes as electrodes 40 and 50 do not mutually cooperate but, instead, each cooperates with an electrode 10.

Claim 17 is further allowable as Pomerantz fails to disclose a mounting structure as electrodes 10, 40 and 50 (as well as the electrodes in the other embodiments) appear to be mounted directly on the wall 30 of container 20. He said in claim that they were mounted in the interior

Obviousness Rejection Based on U.S. Patent No. 4,099,167 to Pomerantz et al. in view of U.S. Patent No. 5,121,639 to McShane

Claims 7 through 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Pomerantz et al. (U.S. Patent No. 4,099,167) in view of McShane (U.S. Patent No. 5,121,639). Applicants respectfully traverse this rejection, as hereinafter set forth.

First, McShane fails to cure the deficiencies of Pomerantz with respect to the limitations of claim 1, from which claims 7 through 11 directly or indirectly depend. Second, McShane is concerned with detecting flow velocity within a conduit and not the level of fluid within a container. Third, McShane uses ultrasonic energy beams and not capacitance in his measurements. Thus there would be no motivation to combine the references or a reasonable expectation of success. Further and as to claims 9, 10 and 11, McShane does not teach the use of

this has been amended

There was no previous mention of capacitance for these claims

an oscillating signal at the Column and lines referenced. Moreover, even conceding the use of an oscillating signal as taught at Col. 5, lines 22-31, the teaching is in the context of generating ultrasonic energy beams to traverse a fluid flow, and not generating an oscillating signal for use with a capacitor.

Withdrawal of the rejection of claims 7-11 is respectfully solicited.

Obviousness Rejection Based on U.S. Patent No. 4,099,167 to Pomerantz et al. in view of U.S. Patent No. 5,135,485 to Cohen et al.

Claims 12 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Pomerantz et al. (U.S. Patent No. 4,099,167) in view of Cohen et al. (U.S. Patent No. 5,135,485). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claims 12 and 13 are allowable as Cohen fails to cure the deficiencies in the teachings of Pomerantz with respect to claim 1, from which claims 12 and 13 each directly depend.

Obviousness Rejection Based on U.S. Patent No. 4,099,167 to Pomerantz et al. in view of U.S. Patent No. 3,939,360 to Jackson

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Pomerantz et al. (U.S. Patent No. 4,099,167) in view of Jackson (U.S. Patent No. 3,939,360). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claim 18 is allowable as Jackson fails to cure the deficiencies in the teachings of Pomerantz with respect to claim 1, from which claim 18 directly depends.

Obviousness Rejection Based on U.S. Patent No. 4,099,167 to Pomerantz et al. in view of U.S. Patent No. 3,939,360 to Jackson as applied to claim 18 above, and further in view of U.S. Patent No. 5,051,921 to Paglione

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Pomerantz et al. (U.S. Patent No. 4,099,167) in view of Jackson (U.S. Patent No. 3,939,360) as applied to claim 18 above, and further in view of Paglione (U.S. Patent No. 5,051,921). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claim 19 is allowable as neither Jackson nor Paglione fails to cure the deficiencies in the teachings of Pomerantz with respect to claim 1, from which claim 19 indirectly depends.

Obviousness Rejection Based on U.S. Patent No. 4,099,167 to Pomerantz et al. in view of U.S. Patent No. 4,365,788 to Block

Claim 20 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Pomerantz et al. (U.S. Patent No. 4,099,167) in view of Block (U.S. Patent No. 4,365,788). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claim 20 is allowable as Block fails to cure the deficiencies in the teachings of Pomerantz with respect to claim 1, from which claim 20 directly depends. Further, Applicants respectfully note that Block teaches a sensor relying upon a change in resistance of electrodes and not a change in capacitance, so there would be no motivation to combine Block with Pomerantz, or a reasonable expectation of success in so doing.

Obviousness Rejection Based on U.S. Patent No. 4,099,167 to Pomerantz et al. in view of and further in view of U.S. Patent No. 5,121,639 to McShane and U.S. Patent No. 5,135,485 to Cohen et al.

Claims 21 and 23 through 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Pomerantz et al. (U.S. Patent No. 4,099,167) in view of and further in view of McShane (U.S. Patent No. 5,121,639) and Cohen et al. (U.S. Patent No. 5,135,485). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claim 21 is allowable as Pomerantz fails to teach the claimed placement and arrangement of mutually cooperative electrodes of a capacitive structure in isolation from fluid within a container, as noted previously with respect to claim 1. Further, and as previously noted, the teaching of driving a capacitive structure is lacking in McShane, who teaches driving a structure for generating an ultrasonic energy beam aimed across a path of flowing fluid. Cohen fails to cure the deficiencies in the teachings of Pomerantz and McShane.

Claims 23-29 are allowable as depending from claim 21. Further as to claims 23 and 24 and as previously noted, the drive frequency employed by McShane is irrelevant as McShane does not drive a capacitive sensor.

Obviousness Rejection Based on U.S. Patent No. 4,099,167 to Pomerantz et al. in view of and further in view of U.S. Patent No. 5,121,639 to McShane and U.S. Patent No. 5,135,485 to Cohen et al. as applied to claim 21 above, and further in view of U.S. Patent No. 4,365,788 to Block

Claim 22 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Pomerantz et al. (U.S. Patent No. 4,099,167) in view of and further in view of McShane (U.S. Patent No. 5,121,639) and Cohen et al. (U.S. Patent No. 5,135,485) as applied to claim 21 above, and further in view of Block (U.S. Patent No. 4,365,788). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claim 22 is allowable as Block fails to cure the deficiencies in the teachings of Pomerantz, McShane and Cohen as applied to claim 21, and further because Block fails to teach the disposition of electrodes of a capacitive structure within a wall of a container. As previously noted, Block uses a resistance sensor to measure level of a molten metal.

#### **Objections to Claim 9**

Claim 9 stands objected to because of informalities. Applicants have amended claim 9 to avoid the objection.

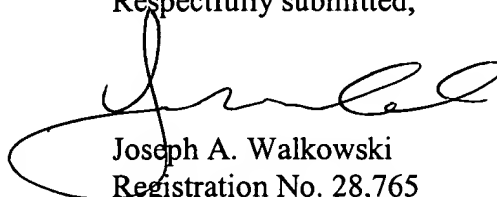
**ENTRY OF AMENDMENTS**

The amendments to claims 1, 2, 3, 9, 14, 16, 20 and 21 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application.

**CONCLUSION**

Claims 1-14 and 16-29 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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Enclosure: Version With Markings to Show Changes Made

Document in ProLaw

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

1. (Amended) A capacitive sensor for detecting a [fluid] level of fluid in a container having an interior volume, the sensor comprising mutually cooperative first and second electrodes arranged for placement on the container in isolation from the interior volume of the container, wherein each electrode exhibits a two-dimensional area having a vertical dimension and a horizontal dimension, and wherein the first and second electrodes are arranged such that a majority of each of their respective areas are vertically and horizontally offset from each other.

2. (Amended) The sensor of claim 1, wherein the first and second electrodes are arranged such that their respective areas are substantially vertically and horizontally offset from each other.

3. (Amended) The sensor of claim 1, wherein the first and second electrodes are arranged such that their respective areas are completely vertically and horizontally offset from each other.

9. (Twice Amended) The sensor of claim 1, further comprising control circuitry, wherein the control circuitry is configured to supply an oscillating signal having a frequency greater than 1 MHz to one of the first and second electrodes.

14. (Amended) The sensor of claim 1, wherein the first and second electrodes are horizontally spaced.

16. (Amended) The sensor of claim [15] 1, wherein the first and second electrodes are [placed] arranged for placement on a wall of the container.

20. (Amended) The sensor of claim [15] 1, wherein the first and second electrodes are placed within the wall of the container.



21. (Twice Amended) A method for detecting a level of a fluid within a container having an interior volume, comprising:

placing a capacitive structure including first and second electrodes on a wall of the container in isolation from the interior volume of the container, wherein each electrode exhibits a two-dimensional area having a vertical dimension and a horizontal dimension and wherein the first and second electrodes are arranged such that a majority of each of their respective areas are vertically and horizontally offset from each other [on a wall of the container];

driving the capacitive structure at a frequency of more than about 1 MHz and generating an output signal from the capacitive structure responsive thereto;

adjusting a fluid level within the container; and

detecting a change in the output signal responsive to the adjusting of the fluid level.